The role of institutions and governance in knowledge generation.

Knowledge networks and their evolutionary-institutional character.

Michael Steiner

JOANNEUM RESEARCH/University of Graz

Preliminary draft with partial need of further elaboration and extension.

Not to be quoted.

Abstract

Despite legitimate recent criticisms concerning the theoretical foundation, the empirical validity and the policy implications of the cluster concept the paper takes the concept as a unifying approach for important elements for the changing character of the innovation process. It outlines the changing legitimization of clusters from a predominantly material linkage and agglomeration based concept to an institution that supports knowledge generation and the sharing of knowledge. In the context of evolutionary and institutional economics arguments are developed that emphasize the specific character of clusters as a form of governance enabling the generation and diffusion of knowledge within and between networks. As institutions they are co-evolving with new technologies and reveal both internal and external variety.

Key words:

Institutionalism, evolutionary economics, knowledge generation and sharing, social technologies.

1. Introduction - network cooporation as a social and cultural phenomenon

Taking for the start a well-known definition of clusters as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions in a particular field that compete but also cooperate” (Porter 1990, 2000) it becomes evident that the emphasis of cluster analysis certainly changed in recent years. The original concentration on the usefulness of the predominantly Porterian cluster model as a concept of “regional competitiveness” has received several well argued criticisms which point to many fundamental conceptual, theoretical and empirical questions and imply that a “much more cautious and circumspect use of the notion” may be necessary (Martin/Sunley 2003, 5). It was also argued that ideas arising from quite different conceptual approaches – sometimes complementary, sometimes contradictory – were included in the discussion of (industrial) clustering leading to confusions and ambiquities (Gordon/McCann 2000, 2005).

Another – indirect – critical assessment of interpretations of economic networks is given by Zuckerman (2003, 545) who “(i)n the face of such cacophony” (i.e. wide variations in subject matter and analytical style concerning economic networks) suggests three conceptions: networks as concentrated exchange, as primordial affiliations, and as structures of mutual orientation. Each of them has a different emphasis: the first interprets the ties as market exchanges (albeit more concentrated than is expected by orthodox market models), the second regards economic interactions shaped in consequential ways by ascribed relationships (and hence insists that market interaction could not be understood without attention to the social relationship), the third emphasizes the specific and different ties leading to “sociometric” networks.Yet all the interpretations have to grapple with some basic questions: can it be established that the structure of the networks has causal implications for the agents of interest, how strong is or can self-interest be in such networks, how much choice is involved in the selection of ties, is there a fitting theory of the firm that might explicate the pattern of relation, how passive (or necessarily active) are the network links?

In a similar vein Maskell and Kebir (2005) point to a lack of conceptual clarity and – very outspoken – to “the risk that the cluster concept will join those rare terms of public discourse that have gone directly from obscurity to meaninglessness without any intervening period of coherence” (p. 2). They nevertheless admit that the cluster phenomenon has attracted

increasing attention. As necessary elements of a "qualified" cluster theory they quote the questions of 'what', 'how', 'why' and usually also of 'when/where/who'.

The recent debate therefore has focussed more on clusters and networks supporting knowledge management and organizational learning emphasizing the organic-evolutionary dimension. Growth of the knowledge base depends on intended and unintended individual processing of experiences, while the interpretation, transfer and use of experiences is influenced by interaction between individuals and between organizations (Cohen/Levinthal 1989, Anderson 1995, Hartmann 2004). Several newly discussed strands of theory from diverse disciplines – economics, geography, sociology, psychology – coincide in the exploration of this aspect of the cluster debate pointing to new important elements for the changing character of the innovation process.

New forms of evolutionary economic behaviour enter the interpretative framework of economics emphasising the role of interaction and coordination processes in the economy that are beyond the individual maximising concept and marked by bounded rationality (Nelson / Winter 1982; Simon 1991; for a recent overview see Foster and Metcalfe 2001). Vast recent research points at networking capabilities as a key factor to innovate and at the fact that the core of innovative capacity resides in the capacity of efficiently combining different pieces of knowledge by various agents and agencies (for a compilation see Ronde/Hussler 2005). Innovation has to be regarded as an evolutionary and social process of collective learning in need of institutional support.

The renewed attention to the role of institutions as a factor shaping economic performance in general and for knowledge creation in specific will be outlined in the following. The complexity of co-operation (Axelrod 1997) is a phenomenon that cannot be explained solely out of individual decision-making - strong rationality is not sufficient for relatively effective economic behaviour. The institutional perspective serves to identify additional factors influencing economic behaviour leading to co-operation and emphasizes that human behaviour has to be understood as a social and cultural phenomenon which is therefore influenced by institutions shaping this behaviour (Hodgson 1998).

We will elaborate arguments that favour the specific character of clusters as an institution for knowledge generation and sharing in a regional context. We will first point to common elements and basic questions of institutional economics relevant for the debate on networks, then introduce specific institutional aspects of knowledge networks and then offer guiding

questions for the further elaboration of the comparative analyses of the IKINET-case studies under this focus.

2. Institutional economics and networks – basic questions and common elements

The recent renaissance of interest in institutions as a factor shaping economic performance has implications also for the creation and sustained existence of clusters as a tool for knowledge management and as learning organizations within and across regions. Knowledge creation and technology management is not an automatic outcome of individually rational behaviour but needs guiding institutions. These guiding institutions have to be seen from „the perspective that technology and institutions should be understood as coevolving“ (Nelson 2001, 19). Development processes do not take place in a vacuum but rather have profound institutional and cultural roots: “The central issue of economic history and of economic development is to account for the evolution of political and economic institutions that create an economic environment that induces increasing productivity” (North 1991, 98). To what extent can clusters be regarded part of this coevolutionary process which is the driving force behind economic growth?

Several general ideas of institutional economics (be they “old” or “new”) seem to be of relevance and help to underline the institutional character of clusters in the process of technological development. They also help to answer the “why”-question which was posed by Arrow (1987, 734) as the essential perspective of New Institutional Economics: “…it does not consist of giving new answers to the traditional question of economics – resource allocation and the degree of utilization. Rather, it consists of answering new questions, why economic institutions emerged the way they did …”.

a) First there is the proposition that “institutions do matter” (Matthews 1986, Williamson 2000) and that individual behaviour is the effect of social institutions moulding behaviour. This was the basic idea already to be found in Veblen (1899): institutions act upon individuals by changing their habits. This habit-formation becomes the more important the more cooperation - instead of competition – is needed: Innovation and productivity gains are based on subtle forms of cooperation, where the creation of new knowledge implies an intense process of interaction which cannot be explained solely out of individual decision making. This is of additional importance if we interpret – as formulated as one of three possible interpretations by Zuckerman (2003, 550) - economic networks as “economic interactions that are shaped in consequential ways by ascribed or

'primordial' relationships where habits are influenced by institutions that pre-exist the market".

b) A further general implication of institutional economics: no entity can ultimately be taken as given. It is neither the individual nor the firm which is the sole "agent" in economic and social life – also clusters are therefore potentially useful units. Especially "old" institutional economics took institutions as well as individuals as units of analysis. This implies also that there is not only an upward causation in the decision making process leading to (more or less) efficient outcomes.

c) Diffferent levels of social analysis therefore have to be regarded. Williamson (2000, 596ff) dinstiguishes four of them: The top level – the level of social embeddedness – locates the norms, customs, mores, traditions which for institutional economists is regarded as given; the second refers to the institutional environment in the sense of formal rules such as constitutions. laws, property rights; at the third level questions of governance are solved whereas only the fourth level is the domain of the usual questions of economics concerning the problems of resource allocation and employment. It is the third level that offers itself for questions of cluster analysis in the form of specific governance structures which influence contractual and network relations. Alluding to the triplet of Commons (1932) of conflict, mutuality and order Williamson sees governance as "an effort to craft order, thereby to mitigate conflict and realize mutual gains". The prevailing governance structures hence reshape the incentives.

d) Different levels also exist within innovation systems. Within these systems there is a "pervasive interactivity and interconnectedness between elements of systems, pointing to the importance of linkages (or the effects of their absence) within innovation systems (and broader socio-economic systems)" (Bryant 2001, 369). These systems operate at several largely self-organizing hierarchical levels, which yet are never fully isolated. Clusters at the regional level are one specific element in this system.

e) Based on Coase there are different forms of governance – markets, hybrids, integration. These hybrids offer themselves as a middle way between methodological holism and methodological individualism (Toboso 2001). According to Williamson the degree of specificity of investment influences the form of governance. It is also the effect of the new information technology that there is a strong presumption for network organization in the domain of hybrids (Williamson 2000,72).

f) Institutions help to explain stronger forms of cooperation which are needed especially when we deal with learning, knowledge creation and diffusion. This is already the case when individuals form their preferences where it would be wrong to start from an institution-free ‘state of nature’ where “learning must in part reconstitute the preferences or purposes of the individual” (Hodgson 2002, xxi). In this sense do “(i)nstitutions … not just constrain options: they establish the very criteria by which people discover preferences” (Powell and DiMaggio 1991, 10-11). This extends on a larger scale where “institutions play an essential role in providing a cognitive framework for interpreting sense-data and in providing intellectual habits or routines for transforming information into useful knowledge” (Hodgson 1998, 171). So were are in need for specific institutional arrangements to improve the generation and diffusion of flows of information.

3. Specific aspects of networks as knowledge generating institutions

a) Networks as a moulding device for the use of technologies

Innovation processes in developed economies have essentially been marked by differing forms of innovative milieus and their supporting institutions. Evolutionary economics – as a special interpretation of the institutional perspective – sees these institutions as a *moulding device for the technologies* used by a society. In the context of this evolutionary perspective, drawing on Nelson/Sampat (2001) and Nelson (2001), institutions can be regarded as "social technologies" where "physical technologies" are a kind of recipe which works regardless to the division of labour, whereas "social technologies " are the specific mode of coordination once there is a division of labour. Social technologies involving "patterned human interaction" become institutions as soon as they are regarded by the relevant social group as standard and become attractive ways to get things done. In Nelson's perspective this concept encompasses ways of structuring activity not only within particular organizations but also across organizational borders: They are not so much constraints on behaviour but rather an effective support as soon as human cooperation is needed (Nelson 2001, 24). Clusters accordingly can be interpreted as a specific social technology for the coordination of the knowledge intensive use of physical technologies – they are a form of productive pathway coordinating human action and combining different factors that are important for growth such as technical advance, physical capital, growth of human capital. Clusters as social technologies are an answer to the problems of achieving agreement and coordination between separate decision making units within a given spatial dimension. They combine different additional elements that are important for regional development and economic growth.

Clusters as specific social technologies can also be viewed as 'modes of governance', as a form of Coasian institution, which tries to integrate the positive external effects of innovation, technological knowledge and development activities. The creation of such institutions may be put in question by high transaction costs. Yet, because of the specific asymmetric and tacit character of technological knowledge, these transactions have to be mediated by non-market methods. Primarily, these transactions are mediated through networks and other forms of arrangements between organizations and individuals, such as procedures which build trust and work to limit the damaging consequences of asymmetric information. Clusters can be regarded as economic clubs, which act as institutions for internalizing the problems of effective knowledge transmission. As such, networks are considered a substitute both for

formal markets and for organizational integration. They therefore fall within the perimeter of non-market devices, which firms use to coordinate their activities with other firms and with other knowledge-generating institutions. They also guarantee a certain exclusivity and constitute a guild-like privilege of valuable knowledge monopolisation.

b) Generating and selecting variety

Economic change is driven by the variety of economic results between competing and alternative possibilities ways of fulfilling needs. On the other hand, the variety of economic results depends on the variety of technical and organizational forms. Innovations introduce new varieties; yet imitation (in a certain sense also learning) and competition consume variety, so that economic progress and economic change depend on the balance of these two factors. Variety and diversity are therefore the main forces of economic progress in the context of a competition-oriented market economy. Therefore policy-making has to look not for optimality but for variety and diversity. One principal concern, therefore, is the difference in the behaviour of firms and the resulting variety of experiments. This implies a specific interpretation of firm behaviour which contrasts with traditional theory, in that it is the outlier firm, and not the representative firm, that is the typical element. There is a substantial diversity between firms – in size, in competence, in knowledge of technological options (Bryant 2001). Thus the attention of the evolutionary policy-maker shifts away from notions of efficiency toward notions of creativity, and patterns of adaptation to market stimuli and technological opportunity. The evolutionary policy-maker therefore adapts rather than optimizes, and his central concern is with the innovation system and the operation of the set of institutions within which technological capabilities are accumulated. Findings on individual cognition and communication indicate that there is not only the problem of quantitative underproduction of knowledge in markets but also a problem of qualitative underproduction of variety of knowledge (Bünstorf 2003, 92). The canonical policy problem is thus defined in terms of the dynamics of innovation, in a world characterized by immense micro-complexity. Since creativity and the generation of variety are central to this approach, the question of the wider institutional structure which supports the innovative activities of firms, is of central concern. This support has primarily to be coordinated through non-market-mediated interactions – the unbiased generation and diffusion of knowledge cannot be expected to come about spontaneously (Bünstorf 2003).

c) "Division of labour" versus "knowledge sharing"

A central fact about the modern process of innovation is that it is based on a division of labour, as clearly foreseen by Adam Smith. He early recognized what is now called the social nature of the innovation process. This division-of-labour induced social process produces efficiency gains from both specialization and professionalization, but also requires a framework to connect together the component contributions of the different agents. As far as knowledge and skills are concerned this aspect of connectivity, or technology transfer, cannot be effectively coordinated by conventional markets: we are in need of specific institutional arrangements.

Yet the aspect of connectivity transcends the usual problems of the "division of labour" – there are additional and non-trivial problems of "knowledge sharing" so far not properly seized by New Institutional Economics. The main line of arguments runs as follows (Brödner/Helmstädter/Widmaier 1999, Helmstädter 2003):

- The pure transaction cost approach misses fundamentally the essence of knowledge as an economic resource. "The new institutional economics is dealing with institutions that govern the interactions taking place under the division of labour, but leaving aside the division of knowledge activities that go with it" (Helmstädter 2003, 14). Once the subject of interaction between participating actors is knowledge the character of interaction changes – the institutional conditions for an efficient division of knowledge are different.

- Social interaction processes – i.e. networks – have different subject matters of their interactions : Leaving aside the political network with the subject matter of political convincing, there are the networks of economic transactions and the one of knowledge sharing. The first belongs to the process of division of labour dealing with the exchange of goods and services, the second with knowledge.

- The main differences reside in the form of interaction and in the impact of interaction: under the division of labour it is transaction of goods and services subject to the rules of competition and their redistribution with exclusivity, under knowledge sharing it is knowledge and skills subject to cooperation and the increase of knowledge for all (inclusivity). Also the next steps are different: in the first case it is separate elaboration, in the second internalization and recontextualization.

- The most important "institutional" consequence is that "cooperation is the basic institution of the process of the division of knowledge" (Helmstädter 2003, 32). But

the degree of cooperation depends again on the type of knowledge use: application has stronger competitive elements whereas the creation and the transfer are dominated by non-economic competition (status, acceptance) and mostly cooperation. The interest lies here in the institutions that make knowledge sharing efficient.

These strands of evolutionary and institutional thinking in the context of knowledge creation and sharing emphasize that connectivity and the desired efficiency cannot be effectively coordinated by conventional markets and stress the importance of institutional arrangements for the generation of knowledge and learning networks which are not all available in the markets. They also emphasize that the growth of knowledge depends on intended and unintended individual processing of experiences, i.e. 'learning', while the interpretation, transfer and use of experiences is influenced by interaction between individuals and between organizations, i.e. 'organizational learning'.

d) Social network model and institutional economics

The importance of specific institutions in support of knowledge generation is not only outlined by recent interpretations of institutional economics, but also by institutional approaches in the field of sociology. At first sight they appear to be exclusive or at least offering different legitimisations for the existence of networks. On second sight they may be regarded as mutually supportive. They can be summarised by the question if knowledge networks are a specific institution of the social network model or a hybrid mode of governance of institutional economics.

In a certain sense this is a reiteration of Granovetter's (1994) "second Coase" question – why do firms have costly cooperations with others and get embedded in social networks - and the answer given in the domain of new institutional transaction-cost economics (Williamson 1996, 2000).

Underlying this question are two contrasting models of institutions (Schmid/Maurer 2003). The sociological approach assumes that coordination mechanisms solely based on decentral decision making do not suffice to establish order needed for continued interaction but that a social process is needed which guides this individual behaviour – human action does not need so much the assumption of rational behaviour but has to be regarded as guided by rules. Individual behaviour is therefore in need of institutions that lead to functioning social

relationships. Exchange is only possible once the agents have agreed on institutions that allow such an exchange. The “exchange” specifically of knowledge then is only possible once there is a sufficient embeddedness and social capital that enables the firms to share their knowledge.

This differs from the economic approach where agents/firms make decisions that form institutions. Interpreted in terms of clusters firms decide to form clubs because they regard it as an efficient way to participate in and to contribute to the generation and diffusion of knowledge. Transaction-cost oriented economics – as outlined by Williamson (2000, 2002) - goes one step further. Social embeddedness is regarded as a higher level of institution and – once regarded as given for considerable amounts of time - influence the choice of contract between market and hierarchy. Once social embeddedness is given, and also adequate property rights, firms can decide about the forms of governance as a third level of institution. The resulting governance structure then reshapes incentives.

Taking these question-answer-positions for granted (which can also be interpreted as a short summary of “neoclassical” versus “social embeddedness” – modes of cluster legitimization) additional insights can be gained by “embedding” the organizational environment into the analysis of transaction problems (Ipsen 2002) and emphasizing the phenomenon of knowledge sharing (in the above mentioned sense of Helmstädter 2003). Here the rationality of the decision is reduced because of the limited information regarding the knowledge to be received so the behaviour can not follow any more the usual economic rules of maximizing. To this changed behaviour adds another element: Transactions – as emphasized by Helmstädter – are, once dealing with knowledge, no more the usual and simple transaction of exchange of goods, but contain strong elements of sharing. The usual rules of economic decision making underwent a double change: both the assumption concerning behaviour as well as the assumption concerning the environment under which decisions are taken - once knowledge is the object – obey other rules.

This leads to the conclusion of the additional insights and implication (as asked by Williamson 1996) that can be gained by referring to the phenomenon of “social embeddedness” in analyzing transactional problems and choices of governance structures (Ipsen 2003, 206f):

- The organizational environment and the content of the transaction allows a deepened analysis of the choice of governance - the more unstable the environment, the less precise the character of the object to be “shared” the less either market or hierarchy

and the more hybrid forms of governance will be chosen. In dependence of moral hazard-risks and availability of social capital quite different types of hybrids may develop. This opens a research agenda for a deeper analysis of diverse cluster forms.

- The transaction relation is more than a “make or buy” decision oriented towards cost-efficient production. The transactional approach is too narrow to account for longer term aspects such as the adaptation to changing market conditions and also for the development of a knowledge base within and between firms. Special organizational forms, i.e. institutions, are of decisive importance for the solution of such complex decision problems.
- The isolated perspective of decisions concerning alternative governance forms therefore is not sufficient because it disregards the specific environmental situation and the content of the transactions; yet this applies also to the opposite perspective – behaviour is not completely determined by social relations, there are still decisions to be made.

4. Basic insights of the Styrian case study and questions for further comparative research in IKINET

Based on the qualitative interviews and supported by empirical evidence the following main conclusions can be drawn from the Styrian case study:

The formation of clusters was a partly endogenous, partly policy driven response to the crisis in the 1970s and 1980s. They are a new institutionalized form of cooperation in order to meet the challenges of new modes of production and their rising knowledge intensity.

Even within the last 10 to 15 years the character of the clusters changed: They are more and more driven by knowledge relations and focussed on new kinds of knowledge-generating institutions.

The intensity of communication and interaction in the regional geography of Styria is much higher in respect to knowledge exchange than in the material input-output dimension. So there is solid empirical evidence that clusters have a dominant knowledge-oriented character.

New supporting R&D-institutions were created – besides universities, semi-public research institutions and diverse technology centres also “Competence Centres” as a new mixture of public and private research organization focussed on industry-specific basic research came into being and now constitute an essential element of industry-science-relations.

Empirical evidence confirms the local/regional dimension of knowledge generation. Most SMEs concentrate their knowledge oriented interaction to regional R&D-institutions. It is rather the big firms and the R&D-institutions themselves which have interregional and international channels of knowledge exchange. In this sense they can be regarded as gatekeepers for the internationalisation of knowledge networks.

Based on this stylized evidence of the Styrian case study report the following topics for focussed comparative analysis are suggested:

Differences in form and content of knowledge networks.

Despite the basic institutional character there is a strong diversity of clusters both in form and content. There is evident progress in the conceptualization of contents and forms of knowledge exchange and learning within networks. Yet there is a need for stronger quantifying – and hence empirically oriented – approaches to get hold of the diversity of knowledge sharing.

Exclusivity of networks.

Governance structures are never deterministic – cluster analysis has to avoid being "oversocialized". Within clusters there is ample room for human agency. One of the basic elements of an evolutionary approach is the creative function of the market as also expressed by innovative behaviour supported by clusters. Yet clusters do have a tendency for exclusivity – part of the goals of networks is to create some kind of knowledge monopolizing market of proximate firms and related support institutions.

Endogenity – exogenity of institutional change of networks.

As an evolutionary institution clusters are also exemplars of the relationship between economic organization and economic development. One important aspect of this perspective is that institutions like clusters are not automatically there but that they are the result of an evolving process shaped by policy activities and entrepreneurial behaviour responding to new challenges. This implies a changing character of institutions in support of knowledge creation and sharing – clusters as a form of "social technology" are co-evolving with new physical technologies and are therefore in a constant need to change themselves. Institutions are themselves shaped by economic behaviour and hence subject to change. Since there is definitely room for agency there is ongoing interaction between the agents and the clusters which is a driving force for the adaptation of clusters. So there is in-built endogenity in the development of clusters: their institutional forms are exogenous in the short-run (so setting the framework for economic relationships and development), but become themselves endogenous over the longer run. The changing character of clusters – in forms of organisation, in the kind and mechanism of knowledge sharing, in their geographical reach – becomes a challenge for further research.

Changing character and internationalisation of clusters.

If clusters are a certain institutional response to a historically given logic of production then clusters themselves have to undergo change. As long as economic growth is to be understood as an evolutionary process the nature and dynamics of the organization of production, the role and change of institutions and technology and technological advance has to be specified.

In a globalized world of freely moving capital and increasingly freely moving people, it is only social capital that remains tied to specific locations. Thus, the "knowledge-based economy" is characterized by the hyper-mobility of information partly also of knowledge and the local character of social capital as a fore-condition for knowledge generation. What does this mean for the institutional setting of knowledge networks in an internationalized framework? What is the relative importance of local versus international knowledge exchange? The relationships between the firms become more complex, risky and require to be redesigned in a long-term perspective. This has compelled firms to devise new organizational forms and contractual arrangements, which may be capable to manage these new and more complex relationships. So the question who are – from a comparative analyses – the gatekeeper of knowledge exchange at an international level is of great importance especially for IKINET.

REFERENCES

Anderson, J.R. (1995), Learning and Memory. An Integrated Approach, New York et al.

Arrow, K. (1987), Reflections on the Essays, in: Feiwel, G. (ed.), Arrow and the Foundations of the Theory of Economic Policy, NYU Press, New York, pp. 727-734.

Brödner, P., Helmstädter, E., Widmaier, B. (eds) (1999), Wissensteilung. Zur Dynamik von Innovation und kollektivem Lernen, Rainer Hampp, München.

Bryant, K. (2001), 'Promoting innovation: an overview of the application of evolutionary economics and systems approaches to policy issues', in Foster, J. and J. St. Metcalfe (eds), Frontiers of Evolutionary Economics, Competition, Self Organization and Innovation Policy, Edward Elgar, Cheltenham, UK and Northampton, MA, USA, pp. 361-383.

Bünstorf, G. (2003), Processes of knowledge sharing: from cognitive psychology to economics, in: Helmstädter, E. (ed.), The Economics of Knowledge Sharing, Edwad Elgar, Cheltenham, pp. 74-99.

Cohen, W.M.; Levinthal, D.A. (1989): Innovation and Learning. The Two Faces of R&D, The Economic Journal, Vol. 99, 569-596.

Foster, J., and J. St. Metcalfe (eds) (2001), Frontiers of Evolutionary Economics, Competition, Self-Organization and Innovation Policy, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.

Gordon, I.R. and McCann, P. (2005), Innovation, agglomeration, and regional development, Journal of Economic Geography, 1-21.

Gordon, I.R. and McCann, P. (2000), Industrial clusters: complexes, agglomeration and/or social networks ?, Urban Studies, 37: 513-532.

Granovetter, M. (1994), Business Groups, in: Smelser, N.J., Swedberg, R. (eds.), The Handbook of Economic Sociology, Princeton, pp. 453-475.

Hartmann, Ch. (2004), Die Lernfähigkeit von Clustern. Eine theoretische und empirische Betrachtung, Ph.D. thesis at the University of Graz, Department of Economics.

Helmstädter, E. (ed) (2003), The Economics of Knowledge Sharing, A New Institutional Approach, Edward Elgar, Cheltenham, UK and Northampton, MA, USA.

Hodgson, G.M. (1998), 'The Approach of Institutional Economics', Journal of Economic Literature, XXXVI, 166-192.

Ipsen, D. (2002), Zum Erklärungspotential von Williamsons Theorie der Wahl der Governance-Formen, in: Ipsen, D., Peukert, H. (eds.), Institutionenökonomie: Theoretische Konzeptionen und empirische Studien, Haag+Herchen, Frankfurt/Main, pp. 67-78.

Ipsen, D. (2003), Transaktionskostenökonomie und soziologische Institutionen-theorie, in: Schmid, M, Maurer, A. (eds.), Ökonomischer und soziologischer Institutionalismus, Metropolis Verlag, Marburg, pp. 191-209.

Martin, R.L. and Sunley, P. (2003), Deconstructing Clusters: Chaotic Concept of Policy Panacea?, Journal of Economic Geography, 3, 1, pp. 5-35.

Maskell, P. and Kebir, L. (2005), What Qualifies as a Cluster Theory?, Danish Research Unit for Industrial Dynamics - DRUID, Working Paper No 05-09.

Nelson, R., Winter, S. (1982), An Evolutionary Theory of Economic Change, Cambridge, MA: Harvard University Press.

Nelson, R. (2001), 'The coevolution of technology and institutions as the driver of economic growth', in J. Foster, J. St. Metcalfe, (eds), Frontiers of Evolutionary Economics, Competition, Self-Organization and Innovation Policy, Edward Elgar, Cheltenham, UK and Northampton, MA, USA, pp. 19-30.

Nelson, R., Sampat, B. (2001), 'Making sense of institutions as a factor shaping economic performance', Journal of Economic Behavior & Organization, 44 (1), 31-54.

North, D.C (1991), 'Institutions', Journal of Economic Perspectives 5, 1: 97-112.

Porter, M.E. (1990), The competitive advantage of nations, MacMillan, London.

Porter, M.E. (2000), 'Location, competition and economic development: local clusters in a world economy', Economic Development Quarterly, 14, 15-34.

Powell, W.W., DiMaggio, P.J. (eds. 1991), The new institutionalism in organizational analysis, University of Chicago Press, Chicago.

Rondé, P., Hussler, C., (2005), Innovation in regions: What does really matter?, Research Policy, Vol. 34, issue 8, 1150-1172.

Schmid, M., Maurer, A. (2003), Institutionen und Handeln. Probleme und Perspektiven der Institutionentheorie in Soziologie und Ökonomie, in: Schmid, M., Maurer, A. (eds.), Ökonomischer und soziologischer Institutionalismus, Metropolis Verlag, Marburg, pp. 9-46.

Simon, H. (1991), Organizations and Markets, Journal of Economic Perspectives, 5, 25-44.

Toboso, F. (2001), Institutional individualism and institutional change. the search for a middle way mode of explanation, Cambridge Journal of Economics, 25, 765-783.

Veblen, T.B. (1899), The theory of the leisure class: an economic study in the evolution of institutions. Macmillan, New York.

Williamson, O.E. (1996), The Mechanisms of Governance, Oxford University Press, New York.

Williamson, O.E (2000), 'The New Institutional Economics: Taking Stock, Looking Ahead', Journal of Economic Literature, XXXVIII:3, 595-613.

Williamson, O.E. (2002), Empirical Microeconomics: Another Perspective, in: Augier, M., March, J. (eds.), The Economics of Choice, Change, and Organization, Edward Elgar, Cheltenham.

Zuckerman, E.W. (2003), On Networks and Markets by Rauch and Casella, eds., Journal of Economic Literature, Vol. XLI, 545-565.